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## Mining for Natural Resources

We make great use of many minerals and materials that make up the Earth's supply of natural resources. Except for the precious metals, such as gold, silver, and platinum, most of the elements are found combined as minerals, usually in localized deposits, and must be mined. After mining, the elements must be extracted from their ores.

In this activity, we will simulate the mining of mineral ores.

**You need to separate the mineral (the chocolate chips) from the sample ore that you have been given. Make two separate piles, one of the mineral and the other of the waste rock (biscuit part of the cookie).**

### Materials

Chocolate chip cookies x2

Toothpicks x 2

Paper towels

Scales x2

### Procedure

1. Obtain two chocolate chip cookies.
2. Place a piece of paper on an electronic balance, zero it, place the cookies on it and weigh them. Record the mass.
3. Using the forceps/toothpicks, remove the chocolate chips from the cookies carefully and place the biscuit crumbs in a separate pile on paper.
4. Weigh another piece of paper.
5. Make sure the chocolate chips have no biscuit crumbs sticking to them.
6. Place the chocolate chips on the weighed paper, place them on the balance and weigh them. Work out the mass of the chocolate chips.

### Results:

Mass of the two cookies ( g)	Mass of chocolate chips obtained (g)	% of chocolate chips ( Mass of chips/mass of cookies x 100)

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## Questions:

1. Were you successful in removing all the chocolate chips? Explain how you dealt with any difficulties.
2. Is the appearance of the chocolate chips different to what you expected? Why?
3. What does the remains of the cookie look like? What would happen to the waste rock (biscuit part) in real life?
4. If you were to be rewarded with an extra cookie for having the highest yield of chocolate chips, how would you have altered your extraction method?
5. Copper ore usually contains much less than 1% copper. What is the amount of ore that would have to be mined to produce 1 tonne of copper?
6. Why was it easier to find gold in Australia 100 years ago than now? Use words such as weathering, erosion and deposition in your answer.
7. The Sphinx in Egypt is built from Limestone. Weathering has affected it more during the last 50 years than in all the time since it was built thousands of years ago. What do you think has caused the weathering to speed up? Explain.
8. Explain why the two granite samples below have different crystal sizes

